

## CLAIMS:

1. Audio enhancement system (1), comprising audio signal (z, y, r) inputs for a distorted desired signal (z, r) and at least a reference signal (y), and a spectral processor (PP) coupled to the audio signal (z, y, r) inputs for processing the distorted desired signal (z, r) by means of the at least one reference signal (y) acting as an estimate for the distortion of the desired signal (z, r), characterized in that the spectral processor (PP) is arranged for modifying said processing such that the estimate for the distortion is a function of A times the spectral power of the at least one reference signal (y), where A is a ratio between the time averaged spectral power of the distortion of the desired signal and the time averaged spectral power of the at least one reference signal (y).
2. Audio enhancement system (1) according to claim 1, characterized in that the estimate for the distortion is at least partly proportional to A times the spectral power of the at least one reference signal (y).
3. Audio enhancement system (1) according to one of the claims 1 or 2, characterized in that the estimate for the distortion at least partly depends on the signal to noise ratio of the distorted desired signal (z, r).
4. Audio enhancement system (1) according to one of the claims 1-3, characterized in that the respective spectral powers are defined by some positive function of the spectral power concerned, such as the spectral magnitude, the squared spectral magnitude, the power spectral density or the Mel-scale smoothed spectral density.
5. Audio enhancement system (1) according to one of the claims 1-4, characterized in that the ratio A is calculated based on data acquired during absence of the desired signal.

6. Audio enhancement system (1) according to claim 5, characterized in that the speech enhancement system (1) comprises a speech activity detector (DET), which is coupled to the spectral processor (PP).

5 7. Audio enhancement system (1) according to one of the claims 1-6, characterized in that the audio enhancement system (1) comprises adaptive microphone filter means (3) coupled to the spectral processor (PP).

8. Audio enhancement system (1) according to one of the claims 1-7,  
10 characterized in that the audio enhancement system (1) comprises one or more loudspeakers (6) and echo cancelling filter means (7) coupled between the at least one loudspeaker (6) and the spectral processor (PP).

9. System, in particular a communication system, for example a hands-free  
15 communication device, such as a mobile telephone, or a voice controlled system, which system is provided with an audio enhancement system (1), the audio enhancement system (1) comprising audio signal (z, r, y) inputs for a distorted desired signal (z, r) and at least a reference signal (y), and a spectral processor (PP) coupled to the audio signal (z, r, y) inputs for processing the distorted desired signal (z, r) by means of the at least one reference signal  
20 (y) acting as an estimate for the distortion of the desired signal, characterized in that the spectral processor (PP) is arranged for modifying said processing such that the estimate for the distortion is a function of A times the spectral power of the at least one reference signal (y), where A is a ratio between the time averaged spectral power of the distortion of the desired signal and the time averaged spectral power of the at least one reference signal (y).

25 10. A method for enhancing a distorted desired signal (z, r), which signal is spectrally processed, whereby at least one reference signal (y) acts as an estimate for the distortion of the desired signal, characterized in that the spectral processing is performed such that the estimate for the distortion depends on A times the spectral power of the at least one  
30 reference signal (y), where A is the ratio between the time averaged spectral power of the distortion of the desired signal and the time averaged spectral power of the at least one reference signal (y).